



US009409062B2

(12) **United States Patent**
Sullivan

(10) **Patent No.:** **US 9,409,062 B2**
(45) **Date of Patent:** **Aug. 9, 2016**

(54) **GOLF BALLS HAVING A MULTI-LAYERED COVER WITH A THERMOPLASTIC INNER COVER LAYER**

(71) Applicant: **Acushnet Company**, Fairhaven, MA (US)

(72) Inventor: **Michael J. Sullivan**, Old Lyme, CT (US)

(73) Assignee: **Acushnet Company**, Fairhaven, MA (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **14/800,753**

(22) Filed: **Jul. 16, 2015**

(65) **Prior Publication Data**

US 2015/0314169 A1 Nov. 5, 2015

Related U.S. Application Data

(60) Division of application No. 13/466,357, filed on May 8, 2012, now Pat. No. 9,084,917, which is a continuation-in-part of application No. 13/416,102, filed on Mar. 9, 2012, now Pat. No. 8,360,902, which is a continuation of application No. 13/397,906, filed on Feb. 16, 2012, now Pat. No. 8,444,507, which is a continuation of application No. 13/024,901, filed on Feb. 10, 2011, now Pat. No. 8,123,632, which is a continuation of application No. 12/233,776, filed on Sep. 19, 2008, now Pat. No. 7,887,437, which is a continuation-in-part of application No. 12/048,003, filed on Mar. 13, 2008, now abandoned, which is a continuation-in-part of application No. 11/767,070, filed on Jun. 22, 2007, now abandoned, which is a continuation-in-part of application No. 10/773,906, filed on Feb. 6, 2004, now Pat. No. 7,255,656, which is a continuation-in-part of application No. 10/341,574, filed on Jan. 13, 2003, now Pat. No. 6,852,044, which is a continuation-in-part of application No. 10/002,641, filed on Nov. 28, 2001, now Pat. No. 6,547,677.

(51) **Int. Cl.**

A63B 37/06 (2006.01)

A63B 37/00 (2006.01)

(52) **U.S. Cl.**

CPC **A63B 37/0076** (2013.01); **A63B 37/0003** (2013.01); **A63B 37/0027** (2013.01); **A63B 37/0039** (2013.01); **A63B 37/0043** (2013.01); **A63B 37/0045** (2013.01); **A63B 37/0062** (2013.01); **A63B 37/0063** (2013.01); **A63B 37/0064** (2013.01); **A63B 37/0066** (2013.01); **A63B 37/0092** (2013.01); **A63B 37/0031** (2013.01)

(58) **Field of Classification Search**

CPC **A63B 37/0076**

USPC **473/376**

See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

5,782,707 A 7/1998 Yamagishi et al.

6,596,801 B2 7/2003 Higuchi et al.

(Continued)

Primary Examiner — Raeann Gorden

(74) *Attorney, Agent, or Firm* — Daniel W. Sullivan

(57)

ABSTRACT

Multi-piece golf balls having a multi-layered solid core and multi-layered cover are provided. In one version, a five-piece ball having a two-layered core and three-layered cover is formed. Preferably, the inner core is made of a thermoset rubber composition and the outer core layer is made of a highly neutralized polymer (HNP) composition. The cover includes inner, intermediate, and outer cover layers, wherein the outer cover is made of a composition comprising a polyurethane, polyurea, or copolymer or blend thereof. In a second version, a six-piece ball having inner and intermediate cover layers that also can be made of HNP compositions is produced. The finished balls have high resiliency and rebounding properties.

12 Claims, 2 Drawing Sheets

